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ABSTRACT

Four independent approaches to the formulation of a taxonomy of review publications and the subsequent development of criteria useful to their planning and evaluation are presented. One approach considers reviews on a continuum of criticality ranging from the bibliographic review through the interpretive to the critical. Another considers types of reviews as information requirements necessary to the development of innovations or the solution of problems. A third alternative characterizes reviews according to the purpose of the producers and the consumers. A final approach shows how criteria may be derived from 1) the type of intellectual processing applied to the preparation of the review, 2) its characteristics (readability, currency, etc.), and 3) its substance. It is shown how evaluation criteria may be developed through the specification of review dimensions. (Author)

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APPROACHES TO ESTABLISHING DIMENSIONS AND CRITERIA FOR EVALUATION OF REVIEW PUBLICATIONS

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SYNOPSIS

Four independent approaches to the formulation of a taxonomy of review publications and the subsequent development of criteria useful to their planning and evaluation are presented. These approaches are based on the type and degree of intellectual processing applied, a transfer model, the purposes of users and producers, and their innate dimensions.

In recent years scholars from a number of disciplines have begun to urge the production of more and better review publications as a way of controlling an increased amount of data and information. These scholars recognize the utility of current efforts, particularly the use of those that involve computer-driven information retrieval systems, in supplying access to this information. They point out however, that the simple provision of efficient access and retrieval of pertinent documents does not solve the problem. Users of these systems are merely presented with a number of documents or citations, some containing the necessary information and some not. They must still carefully peruse these documents, recognize and extract the required information, and convert it to a form that can be absorbed and used. In some cases this effort taxes not only their patience but also their capability. An example of the latter is the case of the practitioner who is confronted with advanced mathematical formulae or theories or research data. True control and ultimate utilization can only be brought about through the processes of purposeful condensation and tailoring the information to the needs of particular audiences. To be useful, information must be of a form and quantity that can be absorbed by human beings.

By themselves, retrieval systems cannot accomplish these things. They are unable to condense, analyze, interpret, synthesize or evaluate information, and they are unable to convert information into usable knowledge. Such transformations are commonly accomplished, however, through the process of reviewing. Reviews therefore have a very basic, almost unique, role to play in the generation and in the ultimate utilization of knowledge.

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One would think that in view of the importance of reviews, information scientists would be diligently studying their characteristics, developing a taxonomy, suggesting procedures for their preparation and evaluating and designing courses for training reviewers. Such is not the case. Reviews, reviewers, and reviewing have all been neglected by information scientists.

In a recent literature survey covering the past ten years this author found that less than three dozen pertinent papers on the subjects of either reviews or reviewing have been published in the English language. The list of these papers was circulated to a number of authorities who were able to add only three citations. Compare this to the several thousand papers on indexing that have been produced! The dearth of scholarly studies on this important subject has prompted the author to share some observations and thoughts on alternative ways to distinguish types of reviews, to define their dimensions and to make a start toward developing planning and evaluation criteria. These measures are necessary to assure quality, to provide guidance to those preparing them, to establish bases for resource allocation and, finally to structure the field in such a way that developed techniques can be taught to others. From a scholarly standpoint these measures can provide a start in an area rich in opportunity.

Three possible approaches to the formulation of a taxonomy of review publications and the possibility of subsequent development of criteria for design and evaluation will be considered: (1) the degree of kind of intellectual effort necessary for their preparation, (2) the purposes of their producers and consumers, (3) their inate dimensions, that is, their substance, characteristics and intellectual level. While all three approaches have their uses the last seems most promising for those interested in further scholarly development.

The intent of this paper is to break ground not by providing a single unifying theory but by offering alternative conceptualizations. The approaches presented are general and are not intended to apply to any one specific subject field. Even though reviews prepared for administrators are a relative rarity in science and technology, reviews for administrators are included since they are fairly common in education. Finally in keeping with the purpose of this paper, reviews are broadly defined. A review is considered to be a narrative presentation or reformulation of existing information on a topic derived from a variety of printed sources.

Intellectual Processing

Discussions of reviews often center about a somewhat simplistic polarization. Typically, in such discussions, mention will be made of the need for expert or critical reviews in a subject field of common interest and concern will be expressed about the unwillingness of experts to prepare them.

The point may then be made that while there are plenty of reviews of the non-critical type published, particularly the bibliographic, this is not what is needed. Predictably, interest will then turn to the "bread and butter" issue of how experts can be remunerated or otherwise encouraged to do the necessary work.

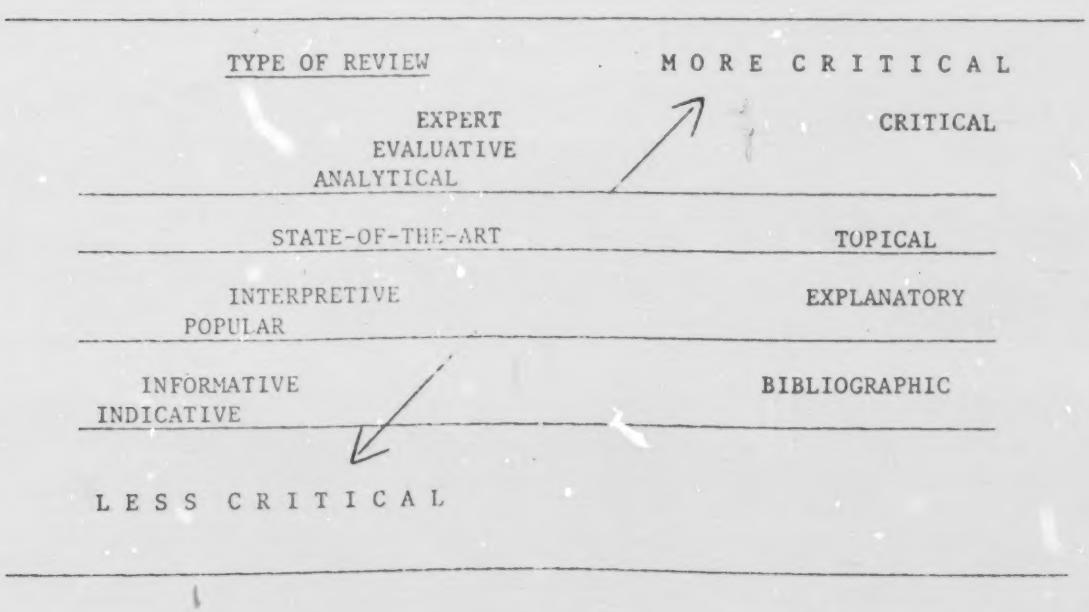
The need for critical reviews is real and the remuneration issue is important. Yet the discussions are simplistic in that they assume there is only one "real" type of review, the critical, and presumably that the other forms are hardly worthy of the name. Completely overlooked are the many other types of reviews which may be prepared by persons with skills other than expert subject knowledge.

These types differ in the kind and degree of intellectual effort necessary for their preparation. Clearly the lowest form is the bibliographic. A distinction, borrowed from the field of abstracting, might be made between the indicative bibliographic review, which is simply a bibliography in narrative form, and the informative. The latter may be considered to require greater "criticality" since significant or comparable data must be extracted from a variety of publications and presented. From these two we could proceed through reviews requiring greater effort such as the interpretive, the state-of-the-art, the evaluative and finally reach the true critical review perhaps written by the outstanding expert. Critical reviews survey entire fields or sub-fields, analyze and evaluate developments, synthesize the distilled results and suggest the direction the field should take.

The various types of reviews can thus be considered to be points that can be located on a continuum based on the intellectual effort that has been applied to them as in Figure 1.

FIGURE 1

REVIEWS ON A CONTINUUM OF CRITICALITY



As one proceeds up the scale the reviews become less literature oriented and more topic oriented and progressively more sophisticated in both the intellectual skills applied to them and the subject expertise involved.

This structuring has several merits. It reveals to the scholar an "intellectual dimension" of reviews which may be capable of further development. It helps the designer to orient himself and, since he knows the type with which he is dealing, it provides some basis for achieving consistency. It helps the administrator to distinguish the variety and degree of skills necessary for preparation of different publications.

Yet the structure is far from satisfying. For one thing, we might accept the fact that some reviews are "higher" and some "lower" in intellectual level. This assumption has obvious validity in the case of the bibliographic versus the critical. Yet in the middle range one would be hard pressed to place the analytical, interpretive, or synthetic on a higher or lower point of the continuum.

An alternative and perhaps more useful structure would be to consider types of reviews on a time scale relating to users' information requirements. The scale would begin with the germination of an idea or the identification of a problem and end with public use of an adopted technique or technology. Early reviews would deal with literature designed to bring the problem into focus for administrators and legislators and to convince them to allocate resources. These reviews may range from simple administrative memoranda to formal research proposals or even to popular reviews appearing in the mass media. If commitments are made to research the problem, state-of-the-art reviews are prepared. As the work proceeds into the research phase there may be need for the methodological and analytical and the synthetic reviews. As the research phase ends and adoption begins there is again need for reviews to interpret the research in language understandable to administrators. Following this second type of commitment, practitioners (teachers, engineers, etc.) require interpretations that allow them to use the results of research as developed techniques or technology. Finally, popular reviews might be prepared that enable the general population to appreciate the advantages and disadvantages of what has been accomplished so they can support, reject or use it.

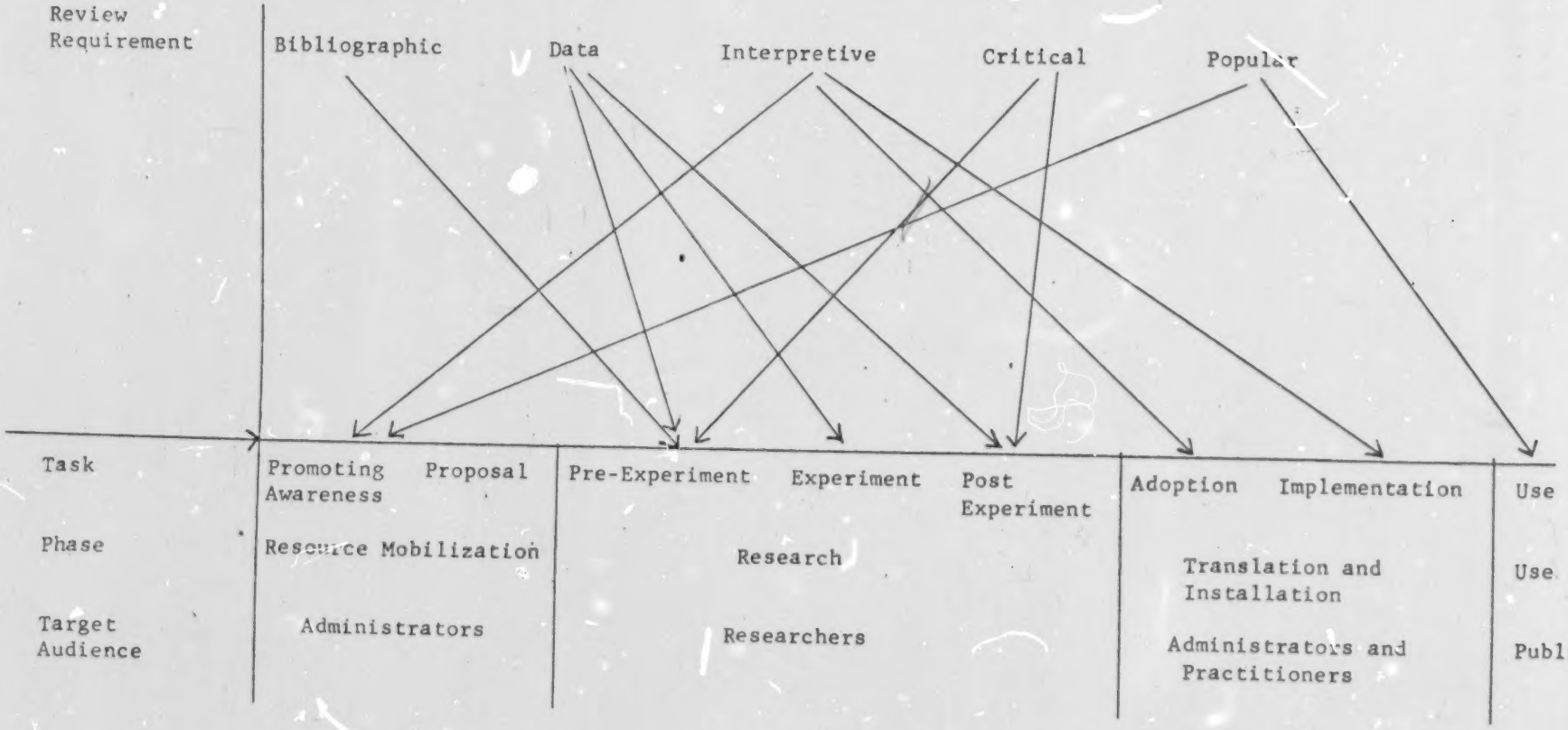
Figure 2 provides an example of such a structure showing how different types of reviews are required for tasks necessary to the development of an innovation. Typical audiences are also indicated. Because of space limitations only five types of reviews are shown, and there are, of course, many more. It should also be recognized that not all tasks and phases are listed, for example a development phase and a maintenance task might also be included.

This developmental model with variations, "loops", and fill-ins has been found useful by those interested in "technology transfer" beyond the research phase. Various types of reviews have always been used within the research stage, interestingly enough in a less systematic way than by those who plan the transfer of techniques and technology.

Both of the foregoing models, the critical and the developmental, suffer from an important defect. They only describe one review dimension. They do not reveal characteristics of reviews other than the intellectual. Yet it is from user requirements in an additional dimension, requirements that reviews be timely, comprehensive, authoritative, readable and so on that those charged with specific planning or preparation derive some of their most important criteria. Something must be added to these models.

Figure 2

Needs for Five Types of Reviews as an Innovation Develops



Perhaps insights into other dimensions and further specification of the intellectual dimension can be arrived at by examining users' purposes in consulting or reading reviews. If we knew their goals perhaps we can design vehicles to reach them.

Purpose of the User

From a review of the deductions of previous authors 1/ and the little empirical evidence available, it would seem that reviews perform four major functions. These functions are similar to those afforded by: (1) textbooks (2) alerting services or current bibliographies (3) reference books and "finding devices" and (4) inspirational works.

The textbook function accommodates those who need to achieve an understanding of an aspect of their own field with which they have limited familiarity. Similarly it accommodates those who need orientation in a new or peripheral field.

As there are a variety of textbooks available on a single topic, designed for different audiences, so there are a variety of reviews that perform the same function. Some translate from one technical language to another. Others interpret material at a popular level. In these ways, reviews provide a means to achieve understanding regardless of the nature of the original material. On this point, Scott Adams noting the institutionalization of this effort in medicine, made the interesting observation that in medicine, the Advances characterize the research level, Yearbooks the practice level, and reviews of the Scientific Monthly type the popular level. 2/

Reviews are not only used to aid in understanding new or peripheral areas or material on a different technical level. They may also be utilized in the same way a student will use a variety of textbooks, that is, to "see" difficult material from a different angle or to make it "sink-in."

In all these ways reviews serve those who are not able or do not have the time to perform the intellectual processing necessary to make original papers usable for their purposes. 5/

A second important function is the current bibliographic. Users, whether they be practitioners, researchers or teachers must maintain current awareness in their field if they are not to become "obsolescent." In some cases, particularly with researchers, they must have assurance that they have not missed recent significant works in the course of their regular reading. When reviews are used to serve these purposes they fulfill the same functions as alerting services or current bibliographies although they more often go beyond the mere provision of references and often supply actual information sufficient to make further consultation of the literature unnecessary. There is some evidence that this continuing education or current awareness function is the most important one served by reviews.

Indexing and abstracting services, data compilations, directories, etc. provide data, information or reference. Reviews are often used for the same purposes. It is true that the review will often provide information in a more timely way or in a context that includes caveats, suggestions or alternatives. Despite this the basic purpose of use is for reference.

Finally, these publications may be used as a source of inspiration, a way of maintaining flagging interest, of stimulating work in new directions. They are a source of new ideas and a "creative bed" for their development.

Actual data on users' purposes in reading or consulting reviews is sparse. Usually they can be found only in bits and pieces within broader user requirement studies. Recently, however, two research studies 3/, 4/ have appeared that provide relatively comprehensive data on purposes served by two specific review publications.

Using both a critical incident technique and a structured questionnaire to study the Annual Review of Information Science and Technology (ARIST) Carlos Cuadra arrived at results that tend to confirm the validity of the four categories. At the same time he provides data on relative use within each category. 5/ Some of his results are presented in Table 1 where they are rearranged to show how the categories he discovers "fit" into the four described above.

Percent of Readers Finding ARIST Useful in Serving Various Goals

Category and Goal	Percent
Textbook	
Learning about an area not in reader's specialty	22
Current bibliographic	
Keeping up with own area	33
Keeping up with peripheral area	35
Reading the original literature more selectively	15
Reference	
Checking on particular project	19
Checking on individuals	5
Inspirational	
Identifying areas that require further research	14
Allocating R&D funds	2
Other	4

Table 1

Similarly when the critical incident technique was used responses were highest in the keeping current and reference areas and in responses related to learning.

Another investigator, Linda Harris, found that the major purposes of use of another review publication (the readership of the Review of Educational Research) were also for learning, keeping current and reference. 6/ In this structured study she included an additional category for "to make sure I hadn't missed important literature." This category demonstrates another aspect of the current bibliography approach emphasizing appropriate selectivity and comprehensiveness rather than currency.

If it is difficult to find data on the purposes of the user, it is almost impossible to find them on the purposes of the producer. Two years ago in "breaking ground" for another project, the author surveyed 20 directors of information centers. The directors were asked in a very open-ended way to indicate their purposes in producing a total of 200 review papers. Responses seemed to fall naturally into five general classes: one literature oriented and four topic oriented. They are tabulated in Table 2.

Producers Purpose in Publishing Reviews

Category	Percent of responses
Aid user to use the literature	40
Provide analysis and evaluation	32
Aid in putting research into practice	16
Educate and stimulate	8
Answer repetitive inquiries	4

Table 2

These replies do not relate to a particular type of review as in the case of the periodic type in the Cuadra and Harris studies since the directors were free to produce any type of review they wished including the periodic.

The results are probably skewed since the centers were at that time only recently organized so that one would expect an over-emphasis on bibliographic reviews while a "data base" was being established. Fewer topical and critical reviews would be expected in information centers than in other centers.

Yet the users and producers do show considerable correspondence in their purposes. Aid to the user in using literature is composed of such replies as "update the user," "update a publication," "provide a comprehensive compilation." It corresponds rather strongly to the reference and current bibliography approach. "Analysis and synthesis" relates to the textbook approach as does "aid in putting research into practice," since they all involve teaching or the preliminaries thereto. The "educate and stimulate" purpose finds its counterpart in the textbook and inspirational types of use.

It is certainly encouraging to find that the purposes of these publications seem to match the purposes of their users. Thus, if a practitioner needs to have a summation of research translated into language he can understand (textbook approach), it is essential that producers match this requirement. If a community of researchers finds it necessary to keep current in a field peripheral to their own (current bibliography approach), it is well that producers fill this need. The categorization proposed thus provides general criteria for whether a type of review is to be produced. It also provides some guidance for the monitor of review programs and a starting point for the student of reviews. The categorization also gives the administrator a tool for structuring the requirements of the marketplace and possible for devising strategies.

Yet the model is not quite satisfactory to the student of reviews. The student needs a way of analyzing their finer structure and of quantifying review parameters and user needs in order to formulate and test hypotheses. The review designer obviously does not need the detail required by the scholar yet he does have a need for finer detail than has been provided so far.

The following section is devoted to how this can be done; how criteria for planning and evaluating reviews can be formed from three review dimensions: intellectual content, characteristics and substance. It will be shown how selection of criteria for design and subsequent evaluation takes place through consideration of user requirements in these areas and how specification and quantification of these criteria may be accomplished in some cases. Scholars will find implicit in the discussions suggestions for further study.

Dimensions and Criteria

In 1959 Isabella Leitch characterized reviews as being of seven types: the periodical review, the occasional, the analytical, those that review data, those that review concepts, the interpretive and the creative. 7/ The periodical is distinguished by its limited and regular time coverage, usually restricted to a year. The occasional review is not distinguished by time but by the expertise or authoritativeness of the writer. It is intended to be selective and not comprehensive. The analytical review was taken in part to be an "... inquiry into the deductions that may be drawn from an accumulation of results treated as a new whole." 8/ Data and concept reviews were obviously distinguished by the things they reviewed. By interpretive review, Leitch did not intend to describe one that translated data or theory into terms understandable to the reader but rather referred to the interpretation and deduction necessary on the part of the writer. The creative review possibly corresponds in part to the synthetic "... the highest and rarest which takes data from more than one field and shows that they are related and what the relation is." 9/ Here she was writing of the generation of new hypotheses and not merely of putting a piece of research in its context.

It is not important at this point that we agree on the definitions and formulations proposed by Leitch. At a future date we can come to an agreement on the meaning of "analysis," "synthesis," "interpretation" and so on. What is important is to see that she was really describing reviews across three dimensions. One dimension is the type and degree of intellectual processing that has been brought to bear. The resulting content constitutes an intellectual dimension. This dimension includes the condensation and transformation that has been applied to information or data to convert it into a form useful to a particular audience or discipline. Some reviews are almost lacking in this dimension in that they merely describe or give references to the material they cover.

Others are rich in that they not only survey the field, identify the trends, and pinpoint the significant, but they actually create new knowledge by formulating new hypotheses.

A second dimension is apparent in her description of periodic reviews and occasional reviews where characteristics such as timeliness, periodicity and selectivity are mentioned. This describes a second dimension, the characteristic dimension. Substance and other content constitutes the third dimension and in the above case it is represented by data and concept. 6/

Since 1959, there have been other attempts to describe types of reviews. On occasion, new types have been uncovered. More often other names are provided for what is really the same concept or new characteristics are announced. Despite this, what we really find in these descriptions are really combinations and reformulations of and discoveries within the three dimensions.

To give one of many examples, in 1961 Scott Adams described the Jahresberichte or discipline review as "... a comprehensive, descriptive record of annual contributions... not created to be critical or evaluative but to provide a systematized running record, year by year, of the contributions made within the disciplines." 10/ Here we can see parts of all three dimensions identified and then combined to conceptualize an important type of review - and all in one simple statement!

There are other indications of the validity and usefulness of these three dimensions. For one thing the few studies that have been published tend to group data according to the above categories. Menzel, 11/ for example, provides a table in which he groups the responses according to characteristics and intellectual content. Cuadra includes a table where percent of use is given for substance. 12/ Also it should be pointed out that the dimensions coincide with the major universal facets proposed by many information scientists, namely substance, process and property. While additional facets are often advanced depending on the discipline, these three are usually proposed as the coordinates or dimensions by which any concept can be described or analyzed.

As discussed above, if we consider the various ways by which reviews have been designated, we find that they are merely expressions of one or more aspects of the three dimensions. The following table illustrates this point.

Types of Reviews

Dimension	Common Designations of Reviews
A. Intellectual content	Evaluative
	Analytical
	Interpretive
	Bibliographic
	Critical
	Creative
B. Characteristic	Comprehensive
	Periodic
	Authoritative
	Popular
	Occasional
	Current
C. Substance and Content	Substantive designation
	Data reviews
	Review of concepts
	Methodological
	Interdisciplinary

Table 3

As described previously, these designations contain the factors that may be used as design and evaluation criteria. Before they can be used in this way they must be listed as illustrated in Table 4.

Specification of Dimensions to Form First Level Criteria

Intellectual content	Characteristics	Substance
Analysis	Authoritativeness	Data
Pin-pointing significant	Comprehensiveness	Theory
Discovering shortcomings	Currency	Methodology
Discovering trends and patterns	Periodicity	Ideas
Synthesis	Degree of compression	Citations
Evaluation	Readability	Interdisciplinary subject
Interpretation	Ease of Use	Substantive designation

Table 4

The items listed within each dimension may now be considered to be first-level criteria. This transformation of dimensions into criteria is a normal progression. Of course, to be considered as true criteria they must be progressively specified and ultimately quantified. Even in the form presented, however, they become a shopping list useful in the planning and evaluation of the publications. Figure 3 shows how this may be done.

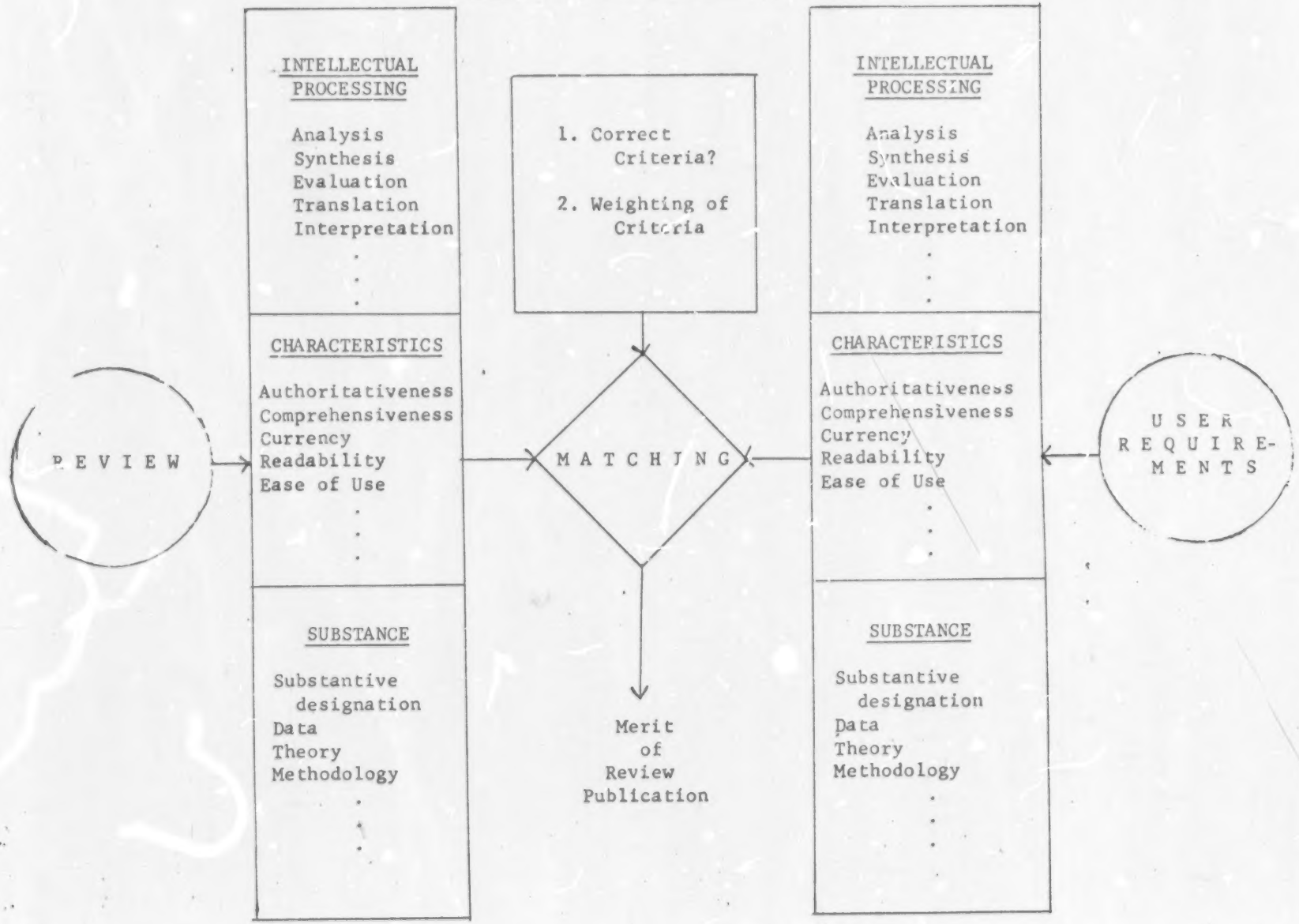
Here, the users' requirements which may be rather amorphous originally are first defined and specified as first-level criteria within all three dimensions. Thus, a general request for information on audio-visual methods in education would be more substantively defined. The other two dimensions would also be specified. Within the intellectual dimension users may or may not require that the material be interpreted or evaluated. In the characteristic dimension, they may require periodic updating on the latest developments in the field or the potential audience may be composed mostly of practitioners so that readability may be important.

Given these requirements, an information analysis center may decide to produce a review for the target audience. The same criteria (in this case readability, currency, etc.) that were derived from an analysis of user needs may now be used in the design of the review. Later evaluation would then consist of measuring the characteristics of the resulting publication against user criteria.

Evaluation criteria developed in recent studies of user requirements may appear to differ from those presented here. Impact and some effectiveness studies seemingly deal in an entirely different coin than that of timeliness, currency and so on. A typical measure of merit in these studies would be that the user's reading of the review did or did not result in an effort to obtain publications that were cited.13/

Figure 3

Design or Evaluation of Reviews



Such measures are useful and necessary but are preparatory to the development of the criteria listed here. To include impact studies this can be shown as in Figure 4 by titling the user circle "User State A" and adding another circle for "User State B." This state is arrived at as a result of the user having read the review. In the case where ultimate effectiveness, e.g. resulting innovations, changes of direction of research projects and so on are considered, an additional circle would have to be drawn for "goal achievement."(Figure 4)

As in all good system work the development of criteria would be a backward progression from the terminal point. Thus a group of users may not attempt to obtain publications cited in a review they have read. In order to either evaluate or design this symptomatic measure must be translated back into the fundamental criteria. That is, it would have to be determined that the review was not current or comprehensive enough or that the format and style discouraged the reader from thoroughly examining the publication.

In addition to design criteria, there are a large group of "producers' criteria" which are outside the scope of this paper. These cannot be considered to be other forms or alternative groupings of the design criteria. They are mostly management criteria derived from the objectives of the producer's organization, its resources and the constraints imposed on it. Additional criteria are derived from the literature environment, mostly the quantity and quality of existing publications and potential duplication or near duplication. Therefore, the decision to produce a review and the selection and emphasis placed on particular design criteria are actually derived from a variety of sources and not just user requirements. This is illustrated in Figure 5.

Criteria from the various sources interact. To illustrate, the need for a current evaluation of a particular topic may have been expressed within a subarea of education, and an information center may have received a number of reference questions on that topic. In deciding whether to publish the review the manager may consider that he does not have a staff member who is expert enough to prepare an evaluative review, nor can he find an outside specialist to do the work. Despite this he may judge that the topic is so significant and the amount of literature so large that, using less specialized personnel, he will publish a non-evaluative review emphasizing currency and comprehensiveness. He notes that this product will be of some immediate use and that, if the bibliographic spade work is done, an outside specialist may be more willing to produce a review. Here we have an interaction between user requirements, resources and constraints resulting in the selection of design criteria.

Returning to Figure 2 one can see then that in a judgment of this particular publication a reasonable selection of criteria would include its comprehensiveness and currency but not the degree of evaluation exercised. The director or manager can possibly be criticized for not electing to produce an evaluative review. The publication itself, however, should not be criticized for being insufficiently evaluative since this feature was not selected as a planning criteria.

The foregoing merely provides a structure and a shopping list of design and first-level evaluation criteria that may be used in planning and evaluating reviews. Designers and evaluators need more.

Figure 4

Three Types of User Studies

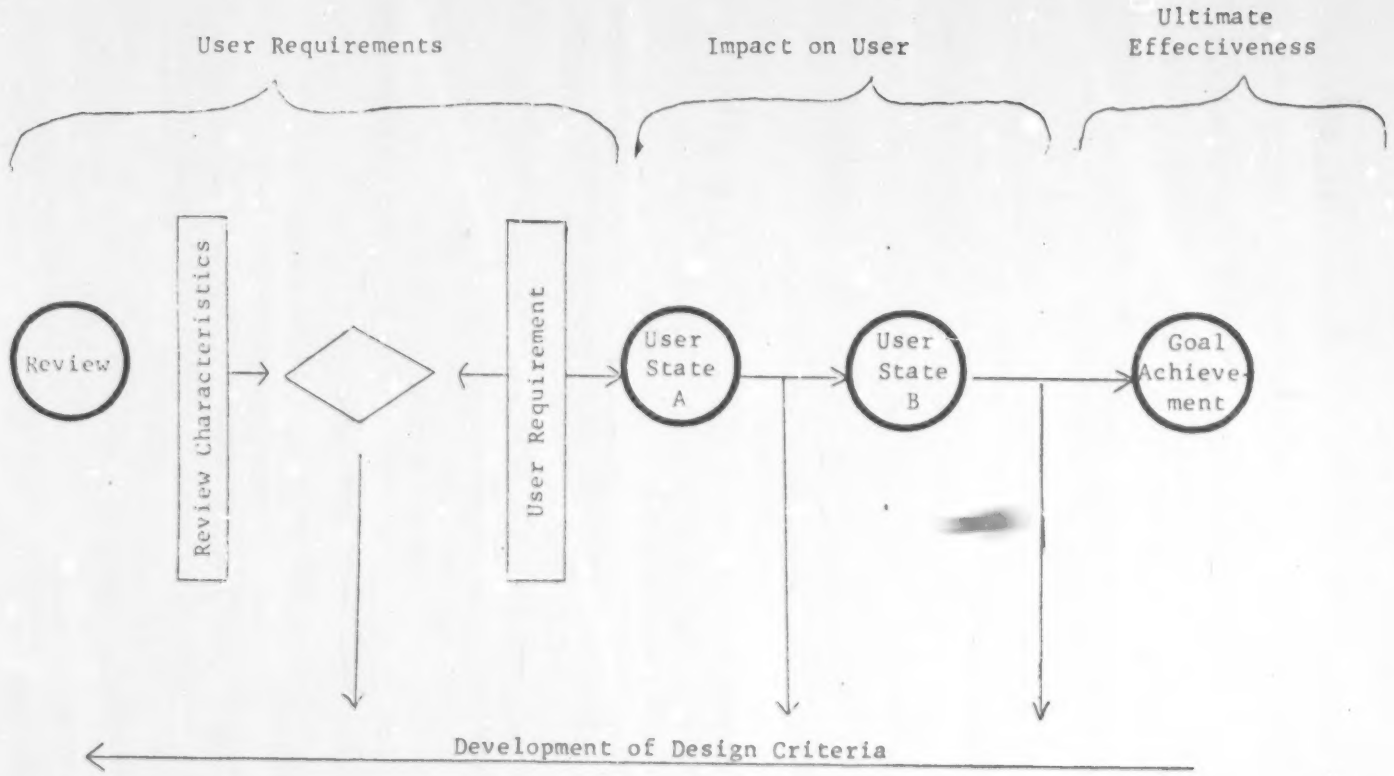
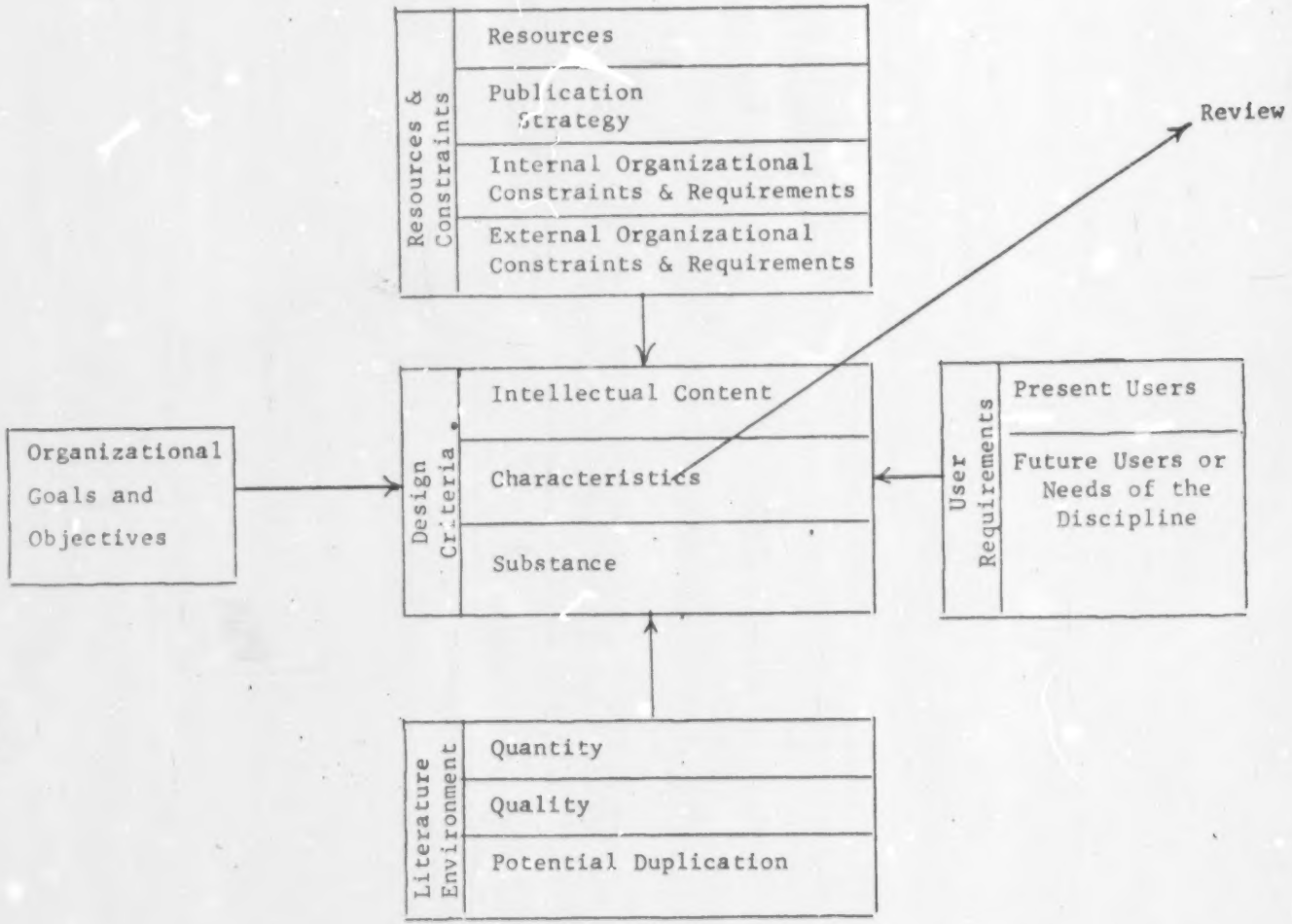


Figure 5 Sources of Criteria in Planning Reviews



Opportunities do exist for making the list of criteria more complete, for defining and specifying them and, at least within the two non-substantive dimensions, for quantifying them.

Benjamin S. Bloom's Taxonomy of Educational Objectives, Handbook I: Cognitive Domain[14] provides definitions for most of the criteria included in the intellectual dimension. Definitions useful to our purposes are provided for terms such as analysis, synthesis, interpretation, translation and others. Also an additional level of specification is provided for each category. For example, "analysis" is defined and divided into three categories (analysis of elements, relationships and organizational principles). This is not to say that these divisions should necessarily be accepted as they stand. For illustration an indication of an alternative type of division is included under "analysis" in Table 4.

There are, of course, alternative models which might be used. J. P. Guilford's familiar "structure-of-the-intellect" model is an excellent possibility.[15]

This model has been used in the field of classification in connection with the development of "relational operators" where Farradane basis the basic mental processes he adopts on Guilford's findings.[16] Guilford himself incidentally took some issue with the Bloom taxonomy which he felt contained "an enormous amount of redundancy" in four of six major categories.[17]

The characteristic dimension provides ready opportunity not only for specification but also for quantification. Rather sophisticated indexes of readability that involve sentence structure, content, number of syllables and word length have been developed and tested.[18]

Attempts have been made to measure currency. A useful way to judge the currency of a publication is simply to consult experts to determine whether recent published studies are included or whether undue reliance was placed on older or even out-of-date publications. This, of course, tells little about the objective age of the material included in the review. Some quantification can be achieved through tabulating the age of the citations in current bibliographies and comparing them with the average age of material included in the review. Similarly, "half-life" studies have been conducted in many fields and subfields. They provide a way of comparing the age of material within a publication with those in the discipline in which its topic falls.

Another opportunity for quantification of characteristic criteria may come about through compression ratios mentioned by Herring[19] and Cottrell.[20] Cottrell proposes the use of a compression ratio (reference pages/state-of-the-art pages) as an evaluation criteria. Herring proposes a similar measure. With reviews of the bibliographic type, recall/precision types of tests might provide a measure of merit although it would be difficult to "fix" the universe from which the publications were drawn.

The most difficult dimension to specify is the substantive. As suggested previously, evaluation in this area may best be left to the subject specialist.[11] Yet even here there are opportunities to develop criteria for design and evaluation. While little can be done to specify actual substance, close criteria and even

specification can be established for format, and statements can be made that alternative solutions to the problem will be included as will appropriate cautions, caveats and constraints. A number of guides have appeared for authors of annual review chapters, review journals and government-sponsored publications that contain specifications for simple content. There are also guidelines for referees that contain criteria for evaluation. These guidelines which are a principal vehicle for presenting authors with all design criteria can be improved as knowledge of reviews grows.

Summary

Four independent approaches to the formulation of a taxonomy of review publications and the consequent development of criteria useful to their planning and evaluation have been presented. One approach considered reviews on a continuum of criticality ranging from the bibliographic review through the interpretive to the critical. Another considered types of reviews as information requirements necessary to the development of innovations or the solution of problems. A third alternative characterized reviews according to the purpose of the producers and the consumers. A final approach showed how criteria may be derived from (1) the type of intellectual processing applied to the preparation of the review (2) its characteristics (readability, currency, etc.) and (3) its substance. It was shown how evaluation criteria may be developed through the specification of review dimensions.

Regardless which approach is taken, the process of evaluation is based mainly on the "match" between user requirements and review characteristics. This is made possible by conceptualizing them in the same way.

An underlying aim of this paper has been to initiate and encourage the development of reviewing as a field in its own right. While each of the four approaches has its special usefulness, the last mentioned seems to offer the most promise for the academic development of the field. From this standpoint efforts should be first directed toward definition of the intellectual processing that takes place in review preparation and requirements for this processing. The works of Guilford and Bloom offer a starting point in this regard.

It is hoped that interested persons will be encouraged to begin work in this area so unexplored yet so rich in opportunity.

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